

Technological Innovation in Firms in the Indian Automotive Component Industry


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Introduction

- The concept of Innovation System and its role in catching up. (List, 1856)
- A promoter of railroads? Is there some interaction? Or just cost reduction?
- “I had not comprehended the importance of the ways of communication,..., I commenced to consider them,..., in relation to their influence upon the moral and political existence, upon social connection, productive forces and the power of nations”.

List, 1856

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- Schumpeter Mark 1 and Mark 2, emphasized the role of the entrepreneur and the later on the large organization in innovation and growth.
 - Large stream of research on innovation in firms.
 - Firms are the units that play the most important role in the innovation system.

Lundvall, 2007

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- There is a general acceptance of the importance of knowledge & learning and their impact on innovation.
 - Knowledge – Tacit or Codified
 - Learning – STI or DUI
 - Innovation – Product or Process, Radical or incremental



Some Research from India

- Bhattacharya (1966) found that the greatest obstruction to the introduction of new technique of winding silk lay in the well known habits and prejudices of the natives.
- Desai (1980) documented the rapid rise of consulting firms and mentioned that a significant proportion of the firms studied had contacts with CSIR with most contacts with labs in same town or region.
- Basant (2007) identifies a wide variety of linkages between industry and academia in Bangalore and Pune (Maharashtra) regions in India.



Research Questions

1. What are the sources of knowledge for Firms in the Indian Automotive component industry?
2. How do these firms access or create knowledge?
3. Is physical proximity a necessary enabling condition for innovation?



Sources of knowledge

- Internal

- ☐ Absorptive Capacity


- External

- ☐ Buyers
- ☐ Suppliers
- ☐ Competitors
- ☐ Universities/ Public Research Institutes
- ☐ Consultants & Trainers?



Why Automotive Component Industry and which States in India

- Paper for Globelics 2008
- Focusing on R&D efficiency in 18 Indian states.
- R&D efficiency looks at most efficient use of R&D inputs to generate R&D outputs.

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- Uses STI data like patents and publications as outputs, and R&D expenditure and personnel as inputs.
 - Methodology used is non-parametric technique Data envelopment analysis (DEA). Charnes et al(1978)
 - Other papers using DEA for R&D efficiency albeit at national level are
 - Rousseau & Rousseau (1997, 1998)
 - Nasierowski & Arcelus (2003)
 - Wang & Huang (2007)
 - Karzakis and Thanassoulis (2003) study effectiveness of regional development policy in Greece.
 - I consider 18 Indian states as Decision Making Units (DMUs) based on data availability on R&D inputs and outputs.
 - Aim is to identify states which are efficient in R&D in India.

INDIA



Efficient States

1. Maharashtra
2. Tamil Nadu
3. U.P.
4. West Bengal

R&D Intensive Firms

1. Maharashtra
2. Tamil Nadu
3. Delhi
4. West Bengal

Auto Component Firms

1. Delhi
2. Maharashtra
3. Tamil Nadu




Results

- Maharashtra, Tamil Nadu, U.P and West Bengal are the most efficient.
- Further exploration on CMIE PROWESS database for Indian Firms reveals that U.P. and West Bengal have fewer R&D Intensive firms.
- R&D Intensity measured as the ratio of R&D expenditure to Sales.

Number of R&D Intensive Firms in Selected Indian States (2006)

| S.No. | States | No. of R&D Intensive Firms |
|-------|----------------|----------------------------|
| 1 | Maharashtra | 285 |
| 2 | Tamil Nadu | 107 |
| 3 | Delhi | 87 |
| 4 | West Bengal | 69 |
| 5 | Gujarat | 62 |
| 6 | Karnataka | 62 |
| 7 | Andhra Pradesh | 60 |
| 8 | Uttar Pradesh | 27 |
| 9 | Haryana | 22 |
| 10 | Rajasthan | 22 |
| 11 | Punjab | 20 |
| 12 | Kerala | 16 |
| 13 | Madhya Pradesh | 9 |
| 14 | Uttarakhand | 2 |

Source: Compiled from CMIE Prowess 3.0

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- Delhi and Maharashtra contribute more than 50 % to total Indian patenting (Gol, 2006).
 - Analysis of location of Automotive component firms confirms that these firms are clustered in the states of Delhi (National Capital Region), Maharashtra and Tamil Nadu.
 - Further analysis through case studies and innovation survey of the firms is required to assess presence and mechanisms of knowledge spillovers and any variations in regional innovation performance of these firms in the 3 regions.



Thank you